CLAIMS

We claim:

1. A method for texture compressing images having a plurality of color components (R, G, B), including defining color representatives for use in encoding, the method comprising:

defining groups of colors for each said color component (R,G,B); and

selecting, for each said group of colors, a representative median color.

2. The method of claim 1, wherein each said group comprises 3 to 15 colors.

3. The method of claim 1, wherein said median color is selected as a member of the respective group located in a middle position of the members of the group arranged in ascending order.

4. The method of claim 1, further comprising computing, for each said group of colors, an error between each member of the group and said representative color of the group.

5. The method of claim 4, wherein computing said error comprises summing the absolute differences (SAD) between each member of the group and said representative color of the group.

6. The method of claim 4, further comprising finding a minmum composite error.

7. The method of claim 1, further comprising excluding groups that include only a minimum color or a maximum color.

8. The method of claim 1, further comprising defining two sets, each set including some groups of color for each said color component (R, G, B) independently, wherein, in one of said two sets, each group includes an increasing number of colors starting from a minimum color and excluding a group with only a lowest color and, in the other of said sets, each group includes a decreasing number of colors starting from a maximum color and excluding a group with only a highest color.

9. The method of claim 4, further comprising:

computing, for each group, said error between the median color and each color composing the group, whereby two sets of errors are computed (Ei and ej),

selecting a first said group and a second said group wherein:

said first group is the group with the minimum error of all the members of said first set of errors (Ei) and said second group is the one that has the minimum error of all the members of said second set of errors (ej); or

all possible combinations of the errors of said first and second sets (Ei + ej) are computed, a global minimum value is found and said first and second groups are jointly selected as those corresponding to said global minimum.

10. The method of claim 1, further comprising defining only two groups of colors.

11. The method of claim 10, wherein said two groups comprise the yellow group and the red group.

12. The method of claim 10, wherein said two groups of colors include 3 and 5 members.

13. The method of claim 1, wherein said images are RGB color images and said color components are the R, G, and B components of said RGB image.

14. The method of claim 1 further comprising:

computing a length value as a maximum quantization error adapted to be computed when pixel Pij colors are quantized during the encoding step;

computing a Euclidean distance (Dist_ij)

$$Dist\_ij = \sqrt{(|R_{ij} - min\_medianR|^2 + |G_{ij} - min\_medianG|^2 + |B_{ij} - min\_medianB|^2)}$$

where Rij, Gij, Bij represent the color components of the pixel Pij at the position ij in said image and min_medianR, min_medianG and min_medianB represent the corresponding reference colors of the selected group for each color; and

encoding each color as a function of said length value and said Euclidean distance.

15. The method of claim 14 further comprising, if a black color is not detected, defining said length value (Length) as:

$$Length\_R = (max\_medianR - min\_medianR)/6$$
$$Length\_G = (max\_medianG - min\_medianG)/6$$
$$Length\_B = (max\_medianB - min\_medianB)/6$$
$$Length = \sqrt{(|Length\_R|^2 + |Length\_G|^2 + |Length\_B|^2)}$$

where max_medianR,G,B and min_medianR,G,B are the representative colors for each selected group belonging to said sets for said color components (R, G, B)

and said colors are encoded as follows:

00 if Dist_ij<= (Length)

01 if (Length)< Dist_ij <= 3*Length

10 if (3*Length)< Dist_ij <= 5*Length

11 if Dist_ij > 5*Length

16. The method of claim 14 further comprising, if a black color is detected, defining said length value (Length) as:

$$Length\_R = (max\_medianR - min\_medianR)/4$$
$$Length\_G = (max\_medianG - min\_medianG)/4$$
$$Length\_B = (max\_medianB - min\_medianB)/4$$
$$Length = \sqrt{(|Length\_R|^2 + |Length\_G|^2 + |Length\_B|^2)}$$

where max_medianR,G,B and min_medianR,G,B are the representative colors for the selected groups belonging to said sets for said color components (R, G, B)

and said colors are encoded as follows:

00 if $R_{ij} = Gij = Bij = 0$

else if R_{ij} or Gij or Bij not equal to 0

01 if Dist ij<= (Length)

10 if (Length)< Dist ij <= 3*Length

11 if (3*Length)< Dist ij.

17. The method of claim 15, further comprising decoding said colors as:

if the code is 00

Rij = min_medianR
Gij = min_medianG
Bij = min_medianB

if the code is 01

Rij = min_medianR+2*length_R
Gij = min_medianG+2*length_G
Bij = min_medianB+2*length_B

if the code is 10

Rij = min_medianR+4*length_R
Gij = min_medianG+4*length_G
Bij = min_medianB+4*length_B

if the code is 11

Rij = min_medianR+6*length_R
Gij = min_medianG+6*length_G
Bij = min_medianB+6*length_B

18. The method of claim 16, further comprising decoding said colors as:

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if the code is 00

   Rij = 0
   Gij = 0
   Bij = 0

if the code is 01

   Rij = min_medianR
   Gij = min_medianG
   Bij = min_medianB

if the code is 10

   Rij = min_medianR+2*length_R
   Gij = min_medianG+2*length_G
   Bij = min_medianB+2*length_B

if the code is 11

   Rij = min_medianR+4*length_R
   Gij = min_medianG+4*length_G
   Bij = min_medianB+4*length_B
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19. A processor for texture compressing images having a plurality of color components (R, G, B), including defining color representatives for use in encoding, comprising:

means for defining groups of colors for each said color component (R,G,B); and

means for selecting, for each said group of colors, a representative median color.

20. The processor of claim 19, wherein said processor comprises a dedicated processor.

21. The processor of claim 19, wherein said processor comprises a general-purpose processor.

22. A computer program product directly loadable into the memory of a digital computer and including software code portions for performing a method, when the product is run on a computer processor, for texture compressing images having a plurality of color components (R, G, B), including defining color representatives for use in encoding, comprising:

defining groups of colors for each said color component (R,G,B); and

selecting, for each said group of colors, a representative median color.